Building Technologies Program

Better Buildings, Brighter Future

Innovative Building Technologies and Practices Save Energy and Money

Today, construction and operation of buildings consumes more energy than any other sector of the U.S. economy, including transportation and industry. Fortunately, the opportunities to reduce building energy use—and associated environmental impacts—are significant. Building owners, developers, and operators can realize attractive returns by adopting energy-efficient technologies and practices.

Almost three-quarters of our nation's 81 million buildings were built before 1979. Some were designed and constructed for limited service, and many will eventually require either significant retrofits or replacement. An additional 15 million new buildings are projected to be built by 2010. Together, aging buildings and new construction represent a tremendous opportunity to transform how we design, build, and operate our buildings.

The U.S. Department of Energy (DOE) Building Technologies Program works to improve the energy efficiency of our nation's buildings—through innovative new technologies and better building practices. In partnership with states, communities, the building industry, and manufacturers of materials, equipment, and appliances, the Program:

- Advances the research, development, and use of energy-efficient building technologies and practices
- Works with state and local regulatory groups and others to improve building codes, appliance and equipment standards, and guidelines for efficient energy use

The Next Generation of Building Technologies

Innovations in energy-efficient building envelopes, equipment, lighting, day-lighting, and windows combined with advances in passive solar, photovoltaic, fuel cells, advanced sensors and controls, and combined heating, cooling, and power have the potential to dramatically transform today's buildings. These technologies—coupled with a whole building approach that optimizes the interactions among building systems and components—will enable our buildings to use considerably less energy.

For example, improvements in the building envelope—advanced framing, insulation, foundation, and roofing technologies—reduce heat loss and gain. Advanced heating, cooling, and ventilation strategies then take the tighter building envelope into account, often featuring downsized

Benefits for Our Homes, Our Businesses, and Our Nation

Energy-efficient buildings use less energy and cost less to operate, saving money for homeowners and businesses alike. They also help the environment, decreasing the need for new power generation and reducing the harmful impact of associated carbon emissions. And they help our nation, improving our energy security as well as our everyday lives, making our homes, schools, and businesses more comfortable places to live, learn, work, and play.

heating and cooling systems and optimized ventilation systems that provide better comfort and air quality. Smart sensors and controls further maximize savings, turning off lights or raising or lowering the thermostat in unoccupied spaces.

Around the country, high performance buildings like 4 Times Square in New York City and Zion National Park Visitor Center in Springdale, Utah, are demonstrating the energy and environmental benefits of advanced building technologies and the whole building approach. Building America homes incorporate energy- and material-saving technologies and building practices, and use 30 percent to 70 percent less energy than comparable homes.

The Promise of Zero Energy Buildings

Zero Energy Buildings take the whole building concept to a new level, integrating advanced building technologies with innovative on-site power generation capabilities. The result? Self-sufficient buildings that produce as much energy as they use. The Building Technologies Program supports research in technology integration and other enabling technologies needed to advance net Zero Energy Buildings.

Raising the Bar

Buildings research also helps lay the groundwork for improved building codes and appliance and equipment standards. The Building Technologies Program works with regulatory groups, product manufacturers, and utilities to develop test procedures and minimum efficiency standards for residential appliances and commercial equipment. In addition, the Program works with national code organizations, state and local jurisdictions, and the building industry to promote stronger building energy codes and to help states adopt and implement these codes.

Raising Awareness

To increase awareness of the energy, economic, and environmental benefits of using efficient building technologies and practices, the Building Technologies Program offers a wide array of tools and guidelines to help builders, contractors, and building owners and operators make energy-smart choices. The Program supports the development of:

- Technical requirements and qualifications defining ENERGY STAR® status, and then works with manufacturers, retailers, and utilities to promote the manufacture and use of ENERGY STAR products
- Building energy software and simulation tools that enable designers to model the savings potential of various energy options
- Commissioning guidelines to ensure that new buildings are functioning as designed and achieving the intended energy savings
- Fact sheets and guidelines on a wide range of subjects, from right sizing heating and cooling systems to advanced wall framing.

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

U.S. Department of Energy
Energy Efficiency
and Renewable Energy

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